

TORREYA

November, 1909

Vol. 9

No. 11

CAR-WINDOW NOTES ON THE VEGETATION OF THE DELAWARE PENINSULA AND SOUTHERN VIRGINIA

BY ROLAND M. HARPER

LIBRARY
NEW YORK
BOTANICAL
GARDEN.

For some reason not altogether obvious, the flora of those parts of the eastern United States where either *Pinus Taeda* or *Pinus echinata* is the most abundant tree is rather uninteresting, as it consists of comparatively few and widely distributed species; and such regions are consequently not much frequented by botanists and not often described in botanical literature. Of this character is a considerable part of the Piedmont region of the Carolinas and Georgia, the summits (not the slopes or gorges) of the Carboniferous plateaus of Alabama, and those parts of the coastal plain which are outside of the ranges of *Pinus rigida*, *P. palustris*, and *P. Elliottii*; particularly in the neighborhood of Chesapeake Bay, and in northwestern Alabama, northern Mississippi, western Tennessee, southeastern Arkansas, etc.* In all these regions there are indeed some limited areas of seacoasts, swamps, rock outcrops, or other more or less exceptional geographical features which serve to diversify the flora and break the monotony, but in the prevailing short-leaf pine forests there is little to attract a botanical collector. Nevertheless, the vegetation of such places deserves to be studied just as much as that of the more favored regions where there is more excitement in the way of rare plants to be had.†

The pine-barrens of New Jersey and those of the southeastern states have been celebrated botanizing grounds for a century or more; but in the corresponding regions between the Delaware

* See *Torrey* 7: 44-45; *Science* II. 25: 541. 1907.

† See *Torrey* 6: 45. 1906; 8: 156. 1908.

[No. 10, Vol. 9, of *TORREYA*, comprising pages 197-216, was issued October 26, 1909.]

and Roanoke Rivers there seem to be very few typical pine-barren plants, or other species, which are not more common elsewhere. It is not surprising therefore that comparatively little has been published about this region (outside of Dismal Swamp and vicinity) by botanists.

About two years ago (Bull. Torrey Club 34: 351-377) I mentioned the principal sources of information about the flora of that part of the coastal plain between the James and Savannah Rivers. That part between the James River and Chesapeake Bay is almost never mentioned in botanical literature, although John Clayton, one of the pioneer botanists of Virginia, resided in that region during most of the eighteenth century; *and for the Delaware peninsula, which is somewhat more accessible, there seem to be at present less than a dozen "local floras." †

Leaving out of consideration papers dealing only with seacoast vegetation, (which has very little in common with that of the interior, is governed by different laws of distribution, and is not dependent on the presence of a coastal plain at all), the following contain most of the available information about the flora of this peninsula. The arrangement is chronological.

1. (Occasional references to plants of Wilmington and vicinity, in the published correspondence of Muhlenberg and Baldwin, especially in 1811.) Darlington's "Reliquiae Baldwinianae", 1843.

2. E. Tatnall. Catalogue of the phaenogamous and filicoid plants of Newcastle County, Delaware. 112 pp. 1860.

3. W. M. Canby. Notes of botanical visits to the lower part of Delaware and the Eastern Shore of Maryland. Proc. Phila. Acad. 1864: 16-19.

4. J. W. Chickering. (Flora of Salisbury and Ocean City, Md.) Field & Forest 3: 154-155. June 1878.

5. W. M. Canby. (Notes on certain trees of the Delaware peninsula.) Bot. Gaz. 6: 270-271. Oct. 1881.

6. C. S. Sargent. (Forests of Delaware and Maryland.) Tenth Census U. S. 9: 511. 1884.

7. H. H. Rusby. A botanical excursion to Asateague Bay. Bull. Torrey Club 18: 250-255. Aug. 1891.

* See Barnhart, Jour. N. Y. Bot. Gard. 10: 178. 1909.

† In Britton's list of local floras (Ann. N. Y. Acad. Sci. 5: 237-300. 1890) there are mentioned only two for Delaware (both for the vicinity of Wilmington), two for Maryland (both for the vicinity of Baltimore), and four for Virginia (two of these pre-Linnaean, another for the mountains in the southwestern part of the state, and the fourth a very brief and bare list of plants from a very unnatural locality on the coast).

8. T. H. Kearney. (Northern limits of "austroriparian" plants.) *Contr. U. S. Nat. Herb.* 5: 450-457. 1901.
9. H. L. Clark. Notes on Maryland plants. *Rhodora* 6: 176-177. Aug. 1904.
10. W. D. Sterrett. Report on forest conditions in Delaware. *Del. Coll. Agric. Exp. Sta. Bull.* 82. Dec. 1908.
11. C. S. Williamson. Notes on the flora of central and southern Delaware. *Torreya* 9: 160-166. Aug. 1909.

There is also considerable valuable information about this region in the reports of the Bureau of Soils of the United States Department of Agriculture, and in other geographical and geological literature, which it would hardly be worth while to mention in such a brief and superficial paper as this.

Having given credit to previous botanical explorers, I will now mention some of my own experiences in the region between the Delaware and Roanoke Rivers, on the way from New York to North Carolina in July, 1908. On July 18 I left the fall-line at Wilmington, Del., and, without getting off the train, went southward via the "Cape Charles route" nearly the whole length of the Delaware peninsula, a distance of about 200 miles, to Cape Charles, Va., where connection is made with the steamer for Norfolk. This route passes through all three counties of Delaware; Wicomico, Somerset, and Worcester in Maryland; and Accomac and Northampton in Virginia. On July 19 I traveled westward from Norfolk on the old Atlantic and Danville R. R. (now a part of the Southern Railway), passing through the counties of Norfolk, Nansemond, Isle of Wight, Southampton, and Greensville, before crossing the fall-line near Emporia, about 75 miles from Norfolk.

The various kinds of country seen in this 275-mile journey through the coastal plain may be briefly described as follows. From Wilmington nearly to Townsend, a distance of 29 miles, the route is through the Cretaceous region, a direct continuation of the corresponding portion of New Jersey, which has been described by Hollick* as the "tension zone" and by Stone † as the Delaware Valley-West Jersey region. The topography here is moderately hilly, the soil is grayish and loamy, and the

* *Am. Nat.* 33: 3, 8, etc. Jan. 1899.

† *Proc. Phila. Acad.* 1907: 452-459. 1908.

forests are nearly all destroyed. Grass-lands are more prevalent than plowed fields, somewhat as in New England.

The Eocene is said to be scarcely exposed in New Jersey and Delaware, and from Townsend to Cape Charles the country is mapped by geologists as Miocene, like the pine-barrens of New Jersey. The Miocene strata do not form much of the soil, however, being nearly everywhere covered by the so-called superficial formations of Pliocene and later age. Going southward from Townsend the country becomes gradually more level and sandy, pines more prevalent, the proportion of cleared land less,* and the civilization and crops more southern in character, all apparently without any abrupt transitions. The peninsula is too narrow to permit any extensive development of streams and valleys, and as the railroad keeps pretty close to the divide most of the way the vegetation visible from the train is mostly of the upland type. Navigable streams were crossed near Seaford and Laurel, Del., and Salisbury and Pocomoke, Md. These all rise in sandy regions, and appear blackish, as swamp water always does when it is several feet deep. Between Clayton and Dover, where the soil is less sandy, at least one muddy stream was crossed. On the left side of the Nanticoke River near Seaford is a faint development of sand-hills, analogous to those of Southeast Georgia, where this feature is best developed.†

Pines were first seen just south of Dover ; and around Felton, about ten miles farther south, a faint suggestion of southern pine-barrens was noticeable. In the southern half of Delaware, which is much more sandy than the northern, most of the towns showed unmistakable evidences of recent growth and prosperity, like all the sandier parts of the southeastern states at the present time. The principal crops here seem to be corn, sweet and Irish potatoes, apples, peaches, and pears.

Of the country between Norfolk and Emporia there is little to be said except that it is comparatively level near the coast and moderately hilly toward the fall-line, and more or less sandy all

* Except that the Maryland part of the peninsula seems to be a little less sandy and a little more under cultivation at present than southern Delaware.

† See Ann. N. Y. Acad. Sci. 17 : 25-27. 1906.

the way. Although there are many fields of corn, cotton, sweet potatoes, peanuts, etc., in this part of the coastal plain, there was generally plenty of virgin forest in sight. More swamps and bogs were seen west of Norfolk than on the peninsula, but no true pine-barrens, or ponds, in either part of the journey.

The prevailing aspects of the vegetation in each region passed through can be inferred from the following lists, in each of which the species conspicuous enough to be recognizable from the train are divided first into trees, shrubs, and herbs, and then arranged as nearly as possible in order of frequency, as determined by the number of times each was seen. Species noted only once in a given region are omitted from these lists in most cases, however. The nomenclature used is that of Robinson & Fernald's Manual, 1908.

Civilization has of course destroyed most of the original vegetation by this time, but it probably has not greatly changed the relative frequency of the native species in that which remains.

In the Cretaceous region of Delaware the country is so largely deforested that the herbs visible from the railroad are mostly weeds, and therefore hardly worth mentioning. The commonest trees seem to be *Liriodendron Tulipifera*, *Liquidambar Styraciflua*, *Salix nigra*, *Castanea dentata*, *Quercus alba*, *Cornus florida*, and *Acer rubrum*.

As no distinct natural boundaries were recognized between Townsend and Cape Charles, I have subdivided this 170 miles of the journey arbitrarily by the two state boundaries crossed. This method, although not very scientific, brings out the gradual change of vegetation in going southward about as well as any other that might be selected.

Between Townsend and Delmar (which is on the boundary between Delaware and Maryland, as the name signifies), a distance of 68 miles, the following species were the most conspicuous :

TREES. — *Pinus Taeda*, *P. virginiana*, *Magnolia virginiana*, *Liquidambar*, *Nyssa sylvatica* (?), *Liriodendron*, *Castanea dentata*, *Salix nigra*, *Acer rubrum*, *Cornus florida*, *Quercus alba*, *Q. falcata*, *Q. Phellos*, *Diospyros virginiana*.

SHRUBS. — *Sassafras variifolium* (mostly a weed), *Alnus rugosa*.*

HERBS. — *Daucus Carota*, *Trifolium arvense* (these two introduced), *Asclepias tuberosa*, *Juncus effusus*, *Nymphaea advena*, *Pontederia cordata*, *Osmunda cinnamomea*, *Pteris aquilina*, *Lilium superbum*, *Plantago lanceolata*, *Lepidium virginicum*, *Cyperus esculentus* (the last three weeds).

According to Sargent (Tenth Census U. S. 9: 511), in the sandy soil of southern Delaware the pines formed fully half of the original forest growth, which was long ago cut away and replaced by a second growth, which however consisted mostly of the same species. Sterrett, writing a quarter of a century later (Bull. 82: 10-12, 17, 19), estimated that only about one-fourth of the area of Delaware is now wooded, and that there is practically no virgin forest in the state. He also states that "Originally the forests of Sussex County [the southernmost] were almost exclusively of hardwoods, but by culling and clearing them pine has gradually been established in every part of the county"; and again: "Lumbering the forests and clearing the land for agriculture have greatly increased the amount of pine and extended its range much farther north." The evidence on which these statements are based is not given, however, and one would probably make no serious error in assuming that *Pinus Taeda* and *Pinus virginiana* were always the most abundant trees in southern Delaware, as they seem to be at present.

In a distance of about 36 miles through Maryland the following species were each noted at least twice:

TREES. — *Pinus Taeda*, *Liquidambar*, *Quercus Phellos*, *Magnolia virginiana*, *Acer rubrum*, *Nyssa sylvatica* (?), *Taxodium distichum*, *Fagus grandifolia*, *Chamaecyparis thyoides*, *Quercus falcata*, *Diospyros*.

SHRUBS. — *Aralia spinosa*, *Alnus rugosa*, *Rhus copallina*.

HERBS. — *Nymphaea advena*, *Pteris aquilina*.

This list is too short to draw any important conclusions from, but the greater relative frequency of *Quercus Phellos*, *Taxodium*

* Some of the *Alnus* seen in Delaware and Maryland may have been the rare and local *A. maritima*, which I have not learned to distinguish under such conditions.

distichum, and *Aralia spinosa* in it as compared with the next above, and the scarcity of *Pinus virginiana* (which was seen only once in Maryland) seems to indicate more of a climax type of vegetation and therefore presumably a somewhat richer soil than the average for the Miocene portion of Delaware.

In Accomac and Northampton counties, Virginia, the following species prevail along and near the axis of the peninsula :

TREES. — *Pinus Taeda*, *Liquidambar*, *Pinus virginiana*, *Ilex opaca*, *Cornus florida*, *Quercus alba*, *Fagus*, *Oxydendrum arbo-reum*, *Acer rubrum*, *Quercus Phellos*, *Nyssa sylvatica* (?), *Quercus Michauxii*, *Pinus echinata*, *Magnolia virginiana*, *Quercus falcata*, *Q. nigra*, *Diospyros*.

SHRUBS. — *Myrica cerifera*, *Aralia spinosa*, *Alnus rugosa*, *Tecoma radicans*, *Rhus copallina*, *Clethra alnifolia*.

HERBS. — (None seen worth mentioning.)

The relative scarcity in this list, as compared with the two next preceding, of *Magnolia*, *Liriodendron*, *Salix*, *Taxodium*, *Chamaecyparis*, *Nymphaea*, and *Lilium* is doubtless due mostly to the narrowness of the Virginia part of the peninsula and the consequent scarcity of fresh-water streams and swamps. The *Cornus*, *Fagus*, *Aralia*, *Myrica*, *Quercus Michauxii*, *Q. nigra*, *Ilex*, *Oxydendrum*, *Pinus echinata*, and *Tecoma* on the other hand are decidedly more abundant in Virginia than in Delaware and Maryland, perhaps only because the center of distribution of each of these species lies farther south ; especially in the case of *Oxydendrum* and *Quercus Michauxii* which have their northernmost known stations on this very peninsula. It should be noted in passing — though I am not yet prepared to explain the significance of the fact — that most of the ten species last mentioned are typical hammock plants in the southeastern states.

Between Pinner's Point (the railroad terminus just across the harbor from Norfolk) and Pleasant Shade, Va. (about eight miles west of Emporia), where metamorphic strata were first noticed, the following species were seen more than once.

TREES. — *Pinus Taeda*, *Liquidambar*, *Liriodendron*, *Quercus alba*, *Salix nigra*, *Pinus echinata*, *Taxodium distichum*, *Nyssa sylvatica biflora* (?), *Magnolia virginiana*, *Quercus falcata*, *Oxy-*

dendrum, *Cornus florida*, *Quercus Phellos*, *Acer rubrum*, *Ilex opaca*, *Diospyros*, *Fagus*, *Quercus marylandica*, *Nyssa aquatica*, *Quercus nigra*, *Betula nigra*.

SHRUBS. — *Arundinaria tecta*, *Myrica cerifera*, *Alnus rugosa*, *Rhus copallina*, *Clethra alnifolia*, *Tecoma*, *Phoradendron flavescens*, *Aralia spinosa*, *Ilex glabra*, *Vitis rotundifolia*, *Rubus cuneifolius*, *Prunus angustifolia* (the last two or three weeds).

HERBS. — *Senecio tomentosus* (a weed?), *Eupatorium rotundifolium*, *Chrysopsis graminifolia*, *Eupatorium capillifolium* (a weed), *Xyris* sp., *Pteris aquilina*, *Habenaria cristata*, *Polygonum Hydropiper*, *Daucus Carota* (these two introduced), *Juncus effusus*, *Rhynchospora inexpansa*, *Ambrosia artemisiaefolia* (a weed), *Verbascum Thapsus* (introduced), *Scirpus Eriophorum*, *Polygala lutea*, *Rhynchospora corniculata*, *Rhexia Mariana* (?), *Mesadenia atriplicifolia* (?).

This list differs from the three or four preceding in the absence of *Pinus virginiana*, *Chamaecyparis*, and *Castanea*, and the presence of *Arundinaria*, *Nyssa aquatica*, *Betula*, *Phoradendron*, *Ilex glabra*, *Senecio tomentosus*, and *Eupatorium rotundifolium*. *Taxodium*, *Liriodendron*, *Salix*, and *Alnus* seem to be more abundant west of Norfolk than on the peninsula, perhaps on account of the greater development of streams.

The following among the species observed from the car windows (or conspicuous by their absence) deserve a little more notice than has been given above. In a few cases notes made on the same trip, in the Piedmont region of Virginia, west of Emporia, have been drawn upon to make the data for certain species which are not confined to the coastal plain more complete.

Senecio tomentosus Mx. Common along the railroad in Nansemond, Isle of Wight, and Southampton Counties, Virginia, from about 12 to 63 miles west of Pinner's Point. I did not see it elsewhere on this trip, though C. S. Williamson (Torreya 9: 166) has reported it as common in southeastern Delaware.

Oxydendrum arboreum (L.) DC. First seen near the southern edge of Accomac County, Virginia.

Aralia spinosa L. Not seen in Delaware, but common in

Somerset and Worcester Counties, Maryland, and still more so in the two peninsula counties of Virginia.

Polygala ramosa Ell. Noticed only once, and that in Southampton County, Virginia. (Several southern pine-barren plants seem to have their northern limits in this same general region, a little west of Dismal Swamp.)

Ilex opaca Ait. First noticed a little south of Bloxom, Accomac County, Virginia, and last about seven miles east of Emporia. In the "manual region" this species seems to be almost confined to the coastal plain, but farther south it is not so restricted.

Nymphaea advena Ait. Seen in most of the rivers and estuaries of Delaware and Maryland, but not at all in Virginia. Farther south it is not known in the coastal plain at all, its place being taken by other species of the same genus.

Magnolia virginiana L. First seen just north of Townsend, Delaware, apparently just about where the Miocene begins. Last seen in Brunswick County, Virginia, about 12 miles west of Emporia.

Castanea dentata (Marsh.) Borkh. Seen a few times between Kirkwood and Wyoming, Delaware, stopping just about where *Pinus Taeda* begins. Not seen elsewhere in the coastal plain on this trip.

Fagus grandifolia Ehrh. (Lately known as *F. ferruginea*, *atropunicea*, or *Americana*.) Not seen until after passing King's Creek, Somerset County, Maryland, strange to say. Thence rather common southward. Possibly this represents the var. *caroliniana* (Loud.) Fernald & Rehder (*Rhodora* 9: 114. 1907), to which is assigned a decidedly more southern range than the type.

Myrica cerifera L. Abundant in the two peninsula counties of Virginia, often attaining a height of ten or twelve feet. Common in the coastal plain west of Norfolk, to within about seven miles of Emporia.

Arundinaria tecta (Walt.) Muhl. Common in the coastal plain west of Norfolk, and seen once in Mecklenburg County, Virginia, fifty miles west of Emporia.

Taxodium distichum (L.) Rich. Seen twice in Somerset County, Maryland, and several times between Suffolk and Drewryville, Virginia. It seems to stop about twenty miles short of the fall-line in Virginia. Sterrett, Williamson, and others have reported it from southern Delaware.

Pinus virginiana Mill. First seen between Viola and Felton, Del., thence rather frequent to Cape Charles. It probably does not occur at all in the coastal plain south of Hampton Roads, however. In the Piedmont region of Virginia it begins to appear in Mecklenburg County, and occurs at infrequent intervals from there to the foot-hills of the Blue Ridge.

Pinus rigida was not seen at all on this trip, which is rather surprising in view of its reported abundance in New Jersey.*

Pinus Taeda L. Common from Dover, Del., to Emporia, Va., thence more scattered in Brunswick County (in the Piedmont region), and rather scarce in Mecklenburg County, where most of the specimens seen were second growth. Last seen between South Hill and Union Level, about 118 miles west of Norfolk.

Pinus echinata Mill. Seen once in Maryland, three times in the Virginia part of the Delaware peninsula, and eight or ten times between Norfolk and Emporia. As *Pinus Taeda* fades away this species becomes more abundant, and it is the prevailing pine in the Piedmont region.

Pinus palustris was not seen anywhere, though the conditions appeared very favorable for it in some places in Nansemond County, Virginia, and it was formerly reported farther north than that. †

* In this connection Vermeule's remarks on its occurrence in the southwestern part of New Jersey (Ann. Rep. State Geol. N. J. 1899 [Forests]: 97-98. 1900) are of interest.

† See Bull. Torrey Club 34: 375. 1907.